A Wellbeing Evaluation of an Online Mindfulness Program

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Abstract

In a world full of distractions, it is becoming increasingly difficult to remain present. Contemporary organizations are reporting rises in levels of work-related stress, anxiety, and depression amongst employees. This means that it has become essential for organizations to introduce effective wellbeing interventions to support employees. Mindfulness interventions are amongst the common wellbeing interventions introduced in organizations making it imperative that rigorous evaluations are conducted. This paper outlines two studies carried out as part of an evaluation of a 14-day online mindfulness intervention program. The evaluation indicators are wellbeing, sleep quality, energy levels, general health, and life satisfaction. Study 1A is a quasi-experimental pre-post design with an intervention (n=21) and control group (n=7). Study 1B is a pre-post design with a sample of teachers engaging with the mindfulness program (n=37). Data for both studies were collected at baseline, and again at the end of the program. Results from repeated measures ANOVA and paired t-tests in Study 1A demonstrated a significant increase in energy levels for the intervention group following the completion of the mindfulness program, while all other indicators demonstrated non-significant differences. Results from Study 1B demonstrated a significant increase across all indicators: wellbeing, health, life satisfaction, sleep-quality, and energy levels. Modified Brinley plots were also utilized to demonstrate individual differences over time. Practical implications, future research directions, and limitations of this research are also discussed.

Introduction

During the past few decades, this world has witnessed exponential growth in technology (Cai, Fan & Du, 2017). The advancements of technology have been incorporated into every aspect of life. In 2020, it was estimated that 3.5 billion people owned a mobile phone, likewise, a staggering 4.57 billion people now have internet access (Clement, 2020; O'Dea, 2020). In fact, in 2011 the United Nations even suggested that internet access should be a human right (La Rue, 2011). The development and widespread use of technology has been both alarming and inspiring. Whilst technology has boosted workplace collaboration, efficiency, and employee flexibility, to a truly remarkable level, it also comes with many challenges (Townsend, De Marie, Hendrickson, 1998).

Gone are the days of stopping to smell the roses, as we navigate a digital era where we are constantly consuming and hence constantly distracted. While globalization and an increasing reliance on technology has revolutionized the business world, it has also had significant implications for the mental health of employees. Contemporary organizations are typically characterized by long hours, high stress, an accelerated pace of work, and constant connectivity (Mazmanian & Erickson, 2014; Murray & Rostis, 2007). Most organizations have expectations that employees will be constantly connected and available, which given how boundless technology is has significant ramifications for employee work/life balance (Mazmanian & Erickson, 2014). In a recently published report about New Zealand employees, work-related anxiety, stress, and depression were identified as common causes for absence from work (BusinessNZ & Southern Cross Healthcare Society, 2019). These levels continue to rise with work-related anxiety, stress, and depression, as causes for absence, leaping significantly from 6.4% in 2016 to 22.2% in 2018 (BusinessNZ & Southern Cross Healthcare Society, 2019). Similarly, in the United States work-related stress is among the top three sources of stress and can be attributed to over 120,000 deaths and approximately $190 billion

dollars in healthcare costs each year (American Psychological Association, 2017; Goh, Pfeffer, & Zenios, 2016).

Workplace health promotion and interventions are designed to promote employee physical and mental wellbeing to ultimately create a healthier workforce (Fertman, 2015). There is a societal shift as organizations are starting to understand the importance of healthy and engaged employees and are beginning to promote employee wellbeing as part of their overall business strategy (Fertman, 2015, p.113). In New Zealand, larger organizations are more likely to have wellbeing programs in place for employees than smaller organizations (BusinessNZ & Southern Cross Healthcare Society, 2019). These large organizations usually have the resources to implement a wide array of in-house wellbeing interventions as well as the tools to identify and accurately measure the wellbeing of employees. Small to medium enterprises (SMEs) tend to not have in-house wellbeing practices and often seek this service externally (Fertman, 2015, p.42). As SMEs dominate the New Zealand economy with the latest data indicating that 97% of organizations are classified as an SME (Small and Medium Businesses in New Zealand, 2016), there is a growing market demand for workplace wellbeing interventions, and concurrently a need to ensure these workplace programs add value to organizations and effectively support employees. There are many examples of workplace wellbeing interventions that are becoming common initiatives in organizations, such as workplace coaching, yoga, meditation, fruit deliveries, positive psychology seminars, and flexible working conditions (Spence, 2015). Furthermore, mindfulness-based interventions (MBIs) are arguably one of the most common workplace wellbeing interventions (Lomas, Medina, Ivtzan, Rupprecht, & Eiroa-Orosa, 2019).

Mindfulness is the “state of being attentive to and aware of what is taking place in the present” (Brown & Ryan, 2003, p.822). There are many types of mindfulness that are commonly practiced, for example, mindful awareness of thoughts and feelings, mindful yoga,

a mindful body scan, mindful breathing meditation, and mindful eating. Mindfulness is practiced on many different media, from meditation classes that can be attended in person, to apps such as Headspace, or online portals. Mindfulness has captivated and fascinated scholars because of consistent research that links its practice with an array of positive impacts for employee stress, health, and wellbeing (Good et al., 2016; Lomas et al., 2017). In corporate settings, organizations like Google, Apple, IKEA, Ford Motors, and Procter and Gamble, are amongst some of the multi-billion-dollar corporations who have introduced mindfulness into the workplace.

Results from meta-analyses have demonstrated a strong positive effect of meditation on wellbeing in both clinical and non-clinical populations (e.g., Grossman, Niemann, Schmidt, & Walach, 2004; Sedlmeier, Loße, & Quasten, 2018). Recent research has demonstrated that mindfulness can decrease stress levels, and increase work performance, resiliency, empathy, satisfaction with work/life balance, and job satisfaction (Allen et al., 2015; Good et al., 2016). Despite the popularity and empirical evidence that supports the effect of mindfulness on employee attitudes, mental health, and valued work behaviours, there are still calls for rigorous evaluations of workplace wellness programs, including mindfulness interventions (Harris, 2016).

This research aims to add to the literature by evaluating the effectiveness of a 14-day online mindfulness program. This research consists of two studies that test pre-and post-intervention differences in employee wellbeing, energy levels, general health, life satisfaction, and sleep quality. Study 1A relies on a sample of employees from nine social enterprise organizations, self-assigned to intervention and control groups, to examine changes in levels of the wellbeing indicators pre-and post-intervention. Study 1B follows the same pre-post intervention design and assesses the same indicators as Study 1A but the sample consists exclusively of New Zealand teachers. Hence, while Study 1A has both an intervention and

control group, there was no control group in Study 1B as all participants engaged in the mindfulness program.

Literature Review

Conceptualizing Mindfulness

Mindfulness is having an awareness of the present moment (Mesmer-Magnus, Manapragada, Viswesvaran, & Allen, 2017). Williams and colleagues (2007) define mindfulness as having three components: 1) intentional, (i.e., one purposely creates an awareness of the present moment); 2) experiential, (i.e., one must focus on the present moment sensations rather than focusing on thoughts, emotions, and situations); and 3) non-judgmental, (i.e., one must view present moment sensations as they are, without attaching thoughts or emotions to them) (Hyland, 2015; Williams, Teasdale, Segal, & Kabat-Zinn, 2007). There are concepts within the mindfulness literature that must first be unpacked to fully understand the research. Firstly, *state mindfulness* is the degree that an individual is aware that they are paying attention to the present moment (Robinson, 2018). Mindfulness was historically conceptualized as a *state*, however there is now empirical support that mindfulness is also a *trait* (Mesmer-Magnus et al, 2017). This is as a result of the observation that there are stable individual differences that influence state mindfulness (Glomb, Duffy, Bono, & Yang, 2011, p.119). Hence, *trait mindfulness* is a dispositional variable that influences the duration, frequency, and intensity that an individual engages in states of mindfulness (Hülsheger, Alberts, Feinholdt, & Lang, 2013). Finally, *mindfulness practice* refers to the mechanism of improving one's state and hence trait mindfulness through MBIs (Hülsheger et al., 2013). These MBIs tend to be either mindfulness-based stress reduction (MBSR) or mindfulness-based cognitive behaviour therapy (MBCT) (Ivtzan & Lomas, 2016, p.6).

As a modern society, we live in a fast-paced world where there is an overwhelming amount of distractions that require attention, often disrupting our state and trait mindfulness. In fact, it is estimated that the human mind wanders for about half of all waking hours

(Killingsworth & Gilbert, 2010). Thus, people tend to show little moment-to-moment awareness, which is what the foundation of mindfulness aims to develop. Mindfulness originated from Eastern contemplative traditions and Buddhism roots, with Thera (2005) even describing mindfulness as the 'heart' of Buddhist meditation (Brown & Ryan, 2003). Grossman et al., (2004) outline the three key assumptions of mindfulness practice: 1) humans tend to be unaware of moment to moment experiences, and are often thinking about the future, the past, or letting their mind drift, rather than being present in the current moment; 2) humans can develop the skills required to increase their present-moment awareness and sustain their attention on mental processes; and 3) this skill development is a slow and gradual process that needs to be practiced frequently. By practicing mindfulness and being more aware of moment-to-moment experiences, people will enjoy a more enriched life because the mind is actively present, rather than being unconsciously reactive (Dreyfus, 2011). Furthermore, Grossman et al. (2004) also reason that sustaining focus on the present moment leads to more accurate perceptions of situations, which in turn allows for improved information processing and the experience of a greater sense of control. Brown and Ryan (2003) outlined that levels of trait mindfulness can increase through mindfulness practice. This finding has since been replicated through meta-analytic evidence numerous times (Janssen, Heerkens, Kuijer, Heijden, & Engels, 2018; Quaglia, Braun, Freeman, McDaniel, & Brown, 2016). Therefore, state and trait mindfulness can be developed through mindfulness meditation. The following sections provide an overview of the literature on the health and wellbeing indicators associated with mindfulness and included in this research's evaluation.

Mindfulness and General Health

Mounting evidence suggests that health promoting behaviours are essential for preventing the development of chronic diseases (Sala, Rochefort, Lui, & Baldwin, 2020), which explains why much of the health psychology literature focuses on understanding the

factors that can influence an individual's decision to engage in these behaviours (Nielsen et al., 2018; Sala et al., 2020). Some of this research has examined whether mindfulness can be a predictor for health promotion behaviours. The literature posits some explanations about why there should be a relationship between mindfulness and health outcomes. Gilbert and Waltz (2010) argue that individuals that have high levels of trait mindfulness will have greater awareness about their urges and health behaviours. For individuals with high trait mindfulness, their thought patterns should present in a way that is non-judgemental and demonstrates self-compassion. Importantly, this higher level of awareness and non-reactivity could assist someone in changing their habits, including the decision to engage in health-promoting behaviours (Gilbert et al., 2010; Sala et al., 2020).

Higher levels of mindfulness have been related to higher levels of self-reported physical health, healthier eating practices, and lower levels of health-risk behaviours (Black, Sussman, Johnson, Milam, 2012; Murphy et al., 2012; Sala et al., 2020). In ground-breaking research, Davidson et al., (2003) reported that engaging in a mindfulness meditation program resulted in positive changes in the brain and immune functions. Furthermore, in a review that compared 20 published randomized control trials (RCT), Black and Slavich (2016) found that practicing mindfulness is related to changes in selected immune system biomarkers. A recent meta-analysis demonstrated that trait mindfulness has a small effect on aggregated health behaviours (r=.08), physical activity, healthy eating, and sleep (r=.08-.14) (Sala et al., 2020).

Another avenue to consider is the role that stress has in the relationship between mindfulness and health. There are many definitions of stress, contemporary stress research broadly defines stress as the result of a perceived gap between personal resources and the perceived demands required to overcome a particular challenge (Hancock & Szalma, 2008). The human body has a complicated psychophysiological response when it experiences stress. For example, more oxygen is sent to the brain to increase levels of alertness, the heart beats

faster which pushes blood to the organs and the muscles, and organs such as the stomach temporarily shut down to conserve energy (O'Connor et al., 2020). This is an extremely effective response for the human body as it conserves resources so that the individual can focus energy on whatever it is that they perceived as stressful. However, issues arise when the body is under long-term stress because persistent high levels of stress cause physiological changes to the body, which can be detrimental to health (Dhabhar, 2014). Relating to mindfulness, there is now extensive research that shows that MBIs can decrease stress levels (Allen et al., 2015), which in turn can increase general health (O'Connor, Thayer, & Vedhara, 2020). Hence, mindfulness can decrease stress levels, which can lead to a positive impact on health perceptions and health behaviours (Roberts & Danoff-Burg, 2010).

The relationship between mindfulness and stress is the most documented relationship in the mindfulness literature (Allen et al., 2015). There is an abundance of randomized control trials that show that levels of mindfulness are negatively related to stress (Aikens et al., 2014; Flaxman & Bond, 2010; Wolever et al., 2012). Thus, Allen et al (2015) highlights in a recent review that there is now ample evidence to conclude that MBIs can reduce stress levels in the workplace. Hence, given all that has been discussed regarding mindfulness and health, the following has been hypothesized:

H1: Levels of self-rated health will significantly increase between T1 and T2 for participants undergoing the mindfulness intervention.

Mindfulness and Wellbeing

Subjective wellbeing has been receiving significant interest internationally from the media, politicians, and academics, because wellbeing is often analysed as indicators for economic and social conditions of a population (Diener, 2006). Subjective wellbeing is defined as "how people experience and evaluate their lives" (Stone & Mackie, 2013, p.15). The research interest in mindfulness and wellbeing has grown exponentially since the pioneering

work of Kabat-Zinn (Kabat-Zinn, 1990). Brown and Ryan (2003) argued that because mindfulness places such an emphasis on disengaging in unhealthy and automatic thought patterns, it can lead to an individual having greater informed appraisals of situations and events. Hence, this greater informed appraisal can provide clarity and vividness to experiences which in-turn can lead to increased wellbeing and happiness (Brown & Ryan, 2003, p. 823). There is substantial evidence that mindfulness is linked to greater levels of mental and emotional wellbeing (e.g., Good et al., 2016; Harrington, Loffredo, & Perz, 2014; Lomas et al., 2019). Conversely, mindfulness has a negative relationship with factors that undermine or are negatively associated with wellbeing, including depressive symptoms (Barnes & Lynn, 2010; Bowlin & Baer, 2012; Jimenez, Niles, & Park, 2010; Petrocchi & Ottaviani, 2016), anxiety (Hou, Ng, & Wan, 2015; Mahoney, Segal, & Coolidge, 2015; Walsh, Balint, Smolira, Fredericksen, & Madsen 2009), and emotional distress (Bhambhani & Cabral, 2015; Masuda & Wendell, 2010).

Mindfulness is based on the premise that people spend most of their time distracted by thoughts of the past or future, and are consumed by automatic thought patterns (Kang, Gruber, & Gray, 2013). These automatic thought patterns typically absorb people and act as a roadblock to being fully present, such thought patterns can include ruminative thoughts. Ruminative thoughts are time-consuming thought patterns that are commonly characterized as repetitive thoughts or feelings which are often fixated towards negative events or feelings, that are dark or sad (Svendsen, Kvernenes, Wiker, & Dundas, 2016). Ruminative thoughts are strongly linked to increased depressive symptom severity and can predict depressive and anxiety disorders (Jain et al., 2007). Mindfulness has also been shown to have a negative relationship with ruminative thoughts (e.g., Long & Christian, 2015; Raes & Williams, 2010; Svendsen et al., 2016). Mindfulness promotes a decentring approach towards thoughts and promotes detaching from automatic thought patterns (Long & Christian, 2015). Thus, engaging in MBIs can decrease

ruminative thoughts by encouraging people to focus on the present moment. This can increase wellbeing as people are able to think more clearly.

In a society that is full of daily hassles and stressors, how someone deals with stress and the consequential behavioural and emotional responses that follow, can significantly impact wellbeing (Chen & Cooper, 2014). When someone is exposed to long-term high levels of stress, combined with poor coping strategies, it often leads to strain and burnout (Maslach et al., 1986). Hence, it is vital that coping strategies are addressed in this review in relation to both wellbeing and mindfulness. Stress coping has been recognized to have two categories: avoidant coping and approach coping. Avoidant coping encapsulates stress responses such as "ignoring, distorting, or escaping threatening stimuli… [which can be conceptualized] in terms of behavioural disengagement, mental disengagement, and denial" (Weinstein, Brown, & Ryan, 2009, p.375). Conversely, approach coping refers to being more adaptive, as people invest effort into trying to overcome or resolve stressful challenges. Theoretically, mindfulness should promote approach coping and discourage avoidant coping (Vinothkumar et al., 2016). This is because the practice of mindfulness is about decentering and appraising events as they occur rather than through negative or distorted thought patterns (Garland, Farb, Goldin, & Fredrickson, 2015). People that practice mindfulness are likely to show greater awareness about how they are coping, leading to more accurate stress appraisals and thus a greater sense of control over the stressor (Weinstein et al., 2009). Hence, given the above evidence about mindfulness and wellbeing it is hypothesized that:

H2: Levels of wellbeing will significantly increase between T1 and T2 for participants undergoing the mindfulness intervention.

Mindfulness and Life Satisfaction

People have long been fascinated with the individual quest to find meaning, joy, and satisfaction in life, so it is no surprise that life satisfaction has been receiving substantial academic interest from many different fields. Life satisfaction is the global, retrospective, evaluation of one's life, which incorporates one's thoughts, attitudes, and expectations of their lives (Diener, 1984, p.550; Pavot & Diener, 2008). Trait mindfulness is theoretically linked to higher levels of life satisfaction (e.g., LeBlanc, Uzun, & Aydemir, 2019; Stolarski, Vowinckel, Jankowski, & Zajenkowski, 2016; Wang & Kong, 2014). Mindfulness can increase emotional awareness of the present moment, which includes a deeper awareness of thoughts, feelings, and situations (Erisman & Roemer, 2010; Hill & Updegraff, 2012). In turn, greater awareness and acceptance of thoughts can lead to higher positive self-evaluations (Kong, Wang, & Zhao, 2014). This is crucial because self-evaluation plays a significant role in perceptions of life satisfaction. When a person holds positive views of themselves and appreciate their life, they experience greater happiness (Judge, Locke, Durham, & Kluger, 1998). Thus, mindfulness has the potential to enhance the experience and awareness of positive emotions and affect, which can lead to higher levels of life satisfaction (Fredrickson et al., 2008). The present study evaluates the potential for a mindfulness intervention to improve perceptions of life satisfaction. The following is hypothesized:

H3: Levels of life satisfaction will significantly increase between T1 and T2 for participants undergoing the mindfulness intervention.

Mindfulness and Sleep Quality

Sleeping problems have become increasingly prevalent over the years, with an average increase in sleep complaints and an average decrease in self-reported sleep duration (Ferrie, Kumari, Salo, Singh-Manoux & Kivimaki, 2011; Kronholm et al., 2008). This information is significant because of the major health and wellbeing outcomes associated with poor sleep (Shallcross, Visvanathan, Sperber, & Duberstein, 2018). These health outcomes include higher

rates of depression and anxiety (Silvertsen, Krokstad, Overland, & Mykletun, 2009), obesity (Cappucio et al., 2008), and premature mortality (Ferrie et al., 2011). Likewise, sleep quality and quantity have significance for both cognitive performance (Lim & Dinges, 2010) and mental health (Freeman et al., 2017).

Lundh and Broman (2000) produced a model that demonstrated two processes interacting to cause insomnia and other sleep disturbances. Firstly, the *sleep-interfering processes* include arousal-producing thoughts such as personal worries, stressors, and emotional conflicts that interfere with the ability to fall asleep and subsequently influence sleep outcomes. Relating to mindfulness, it has been shown that mindfulness can decrease ruminative thoughts (Jain et al., 2007), reduce arousal-producing processes (Ong, Shapiro, & Manber, 2008), and can decrease emotional reactivity (Desbordes et al., 2012). The second part of this model is the *sleep-interpreting process*, which comprise of psychological patterns that are often misconceptions of sleep, for example, having high expectations of sleep, certain dysfunctional beliefs about sleep, or fears about the causes and consequences of a lack of sleep (Lundh & Broman, 2000; Lundh, 2005). Similarly, mindfulness has been shown to promote the non-judgmental appraisal of experiences to help facilitate the onset of sleep (Ong, Ulmer, & Manber, 2012). Lundh (2005) argued that sleep could be improved by strategies that create accepting and non-judgemental thought processes preceding the onset of sleep, including mindfulness. The practice of mindfulness may dissuade an individual from dwelling on the fact that they are unable to sleep, and instead to simply observe it as a fact without the emotional attachment. There has been substantial research into the relationship between mindfulness and sleep-related outcomes. Mindfulness has been associated with improved sleep quality (e.g. Howell, Digdon, & Sheptycki, 2008; Querstret, Cropley, & Fife-Schaw, 2017; Wolever et al., 2012), and reduced daytime sleepiness (Ong, Shapiro, & Manber, 2009). In a recent review by Ong and Moore (2020), several randomized control trials were analysed and indicated general

support for the positive impact of mindfulness interventions on self-reported sleep outcomes, suggesting that MBIs can be valuable non-pharmacological interventions for improving sleep (Ong & Moore, 2020).

Most published articles investigating mindfulness and sleep involve clinical populations with significant sleep disturbances. Hence, this study will add to the emerging body of knowledge and test the mindfulness-sleep association in non-clinical samples (e.g., Klatt, Norre, Reader, Yodice, & White, 2017; Querstret et al., 2017; Wolever et al., 2012). This study aims to answer the calls from Rusch et al., (2019) for more research on the relationship between mindfulness practice and sleep quality. The following has been hypothesized:

H4: Levels of sleep quality will significantly increase between T1 and T2 for participants undergoing the mindfulness intervention.

Mindfulness and Energy Levels

Fatigue is the perception of tiredness or lack of energy (Ahola & Hakanen, 2007). Fatigue typically has the characteristics of a decrease in motivation, decreased ability to concentrate, and a reduction in activity (Beurskens et al., 2000). Fatigue is conceptually different to normal tiredness. While normal tiredness is by no means a pleasant experience, it can usually be fixed by rest and sleep, whereas fatigue cannot (Rose et al., 2017). The causes of fatigue vary and may include prolonged sleep disturbances, chronic pain, depression, and anxiety (Ikeuchi et al., 2020). Employee fatigue has been linked to errors in judgement, reduced decision-making ability, and reduced productivity and performance (Caldwell, Caldwell, Thompson, & Lieberman, 2019). Therefore, there has been significant interest recently about ways to address fatigue, including the practice of mindfulness.

A randomized control trial showed that the intervention group of a mindfulness program showed a significant decrease in levels of prolonged fatigue compared to a control group after the program finished (Huang, Li, Huang, & Tang, 2015). This finding that

mindfulness is associated with lower levels of fatigue has been replicated in other studies (Gregoire & Lachance, 2015; Querstret et al., 2017). Research measuring the effect of mindfulness programs on energy levels is still in its infancy, which provides an opportunity for this research to contribute to the mindfulness literature. Given the outlined evidence, the following is hypothesized:

H5: Levels of self-reported energy levels will significantly increase between T1 and T2 for participants undergoing the mindfulness intervention.

As noted, more research is needed to explore the relationship between mindfulness and energy levels to verify the limited findings currently available. Additionally, more research is required to understand the mechanisms behind the relationship between mindfulness and energy levels as this is a significant gap in the literature. Furthermore, this research provides an opportunity to add further evidence of the current literature findings. The literature frequently criticises the quality of studies within the mindfulness literature (King, 2019, p.201). For example, within the mindfulness and health literature, it is argued that the weak design of studies significantly limits the strength of evidence currently available (Olson & Emery, 2015). These shortfalls within the mindfulness literature often include limited descriptions of the mindfulness program, a lack of randomization, no control group etc. Hence, this study aims to provide a valuable contribution to the literature through a comprehensive evaluation of two mindfulness-programs in workplace settings. The evaluation indicators have been selected with the aim of addressing the limited evidence currently available within the mindfulness literature.

Method

Study 1A Context and Overview

As both Study 1A and Study 1B are being conducted in 2020 it is essential to be aware that COVID-19 will have some contextual influence on these findings. During the final week of the workplace challenge for Study 1A, there was an announcement that New Zealand had a case of COVID-19 in the community after 102 days of no community transmission which meant alert levels changes for participants.

Design

The design of Study 1A is a quasi-experimental pre-post design with data collection at two time points: pre-intervention (T1) and post-intervention (T2). Participants self-selected into either the control group or to the intervention group.

Participants

The participants of Study 1A are employees working in a hub of 9 small social enterprise organizations in New Zealand. No incentive was provided to participants other than free access to a mindfulness program for 14-days. There was no demographic information collected about participants. 68 participants registered for this challenge, 47 participants engaged with the mindfulness program, and 45 participants completed the T1 survey. 28 participants completed responses at both T1 and T2. The final sample consisted of 21 participants who engaged in the mindfulness program and also completed T1 and T2 surveys (i.e., the intervention group), and 7 participants who completed both T1 and T2 surveys but did not engage in the mindfulness program (i.e., the control group).

Materials

Participants had free access to a 14-day trial of a mindfulness online portal. The opening page of the portal had two sections 1) listen and 2) reflect. Participants were also provided an information and consent form to read and sign before completing the surveys. A full copy of this information and consent form can be found in Appendix A.

Online Mindfulness Tracks

The listen section of the online portal displayed the mindfulness track of the day. Participants could scroll down and access their mindfulness library that displayed all of the mindfulness tracks available. Participants had access to 15 tracks, one track for each day plus an introduction to the mindfulness track. The average length of the mindfulness sessions was 5 minutes, with the shortest track being the introduction track at 2 minutes, and the longest track being day 8 at 7 minutes. A list of the titles of the meditation tracks is in Appendix B.

Measures

Wellbeing

To measure wellbeing, the Short Warwick-Edinburgh Mental Well-being Scale (Stewart-Brown et al., 2009) was applied. This scale consists of seven items that are measured on a 5-point Likert scale. Responses for this scale ranged from: strongly disagree (1), disagree (2), somewhat agree (3), agree (4), strongly agree (5). Participants were asked to reflect on the past 7 days when answering these questions. Examples of items include: During the past 7 days… "I've been feeling useful"; "I've been feeling relaxed"; "I've been dealing with problems well". Higher overall scores indicate higher levels of wellbeing; likewise, lower overall scores indicate lower levels of wellbeing. A full list of these items can be found in Appendix C. Internal construct validity was provided from the Rasch Measurement Model which demonstrated a valid score and a high correlation (r=.95) to the original full wellbeing scale (Stewart-Brown et al., 2009).

Energy

The brief fatigue syndrome scale (Arnetz, Frenzel, Akerstedt, & Lisspers, 2008) is a one-item scale which subjectively measures energy levels. This one-item scale is: "During the past 7 days, how would you rate your energy levels?". This item is rated on a 5-point Likert

scale with the responses of: terrible (1), poor (2), fair (3), good (4), and excellent (5). Higher scores denote higher levels of energy while lower scores indicate lower levels of energy. Arnetz et al., (2008) reported a Cronbach's α of >.70 when validated with three different groups of participants, this indicates an acceptable level of internal reliability.

General Health

To measure general health the self-rated health scale by (Idler & Kasl, 1991) is applied. This is a one-item scale which asks: "How would you rate your health at the present time?". This is rated on a 5-point Likert scale with the responses of terrible (1), poor (2), fair (3), good (4), and excellent (5). Higher scores denote higher levels of general health while lower scores indicate lower levels of general health. Idler and Benyamini (1997) reviewed a range of similar single-item self-reported health indicators with minor wording differences. They concluded that the overarching meaning of these different items is robust which overrides the minor differences in wording. Whilst there was no validity or reliability values published, the authors claim that there is high validity as these health items can predict health outcomes such as mortality (Idler & Benyamini, 1997, p. 31).

Sleep Quality

The single item sleep quality scale (Snyder, Cai, DeMuro, Morrison, & Ball, 2018) measures the quality of sleep. It is a single-item scale: "During the past 7 days, how would you rate your sleep quality overall?". This item is measured on a 5-point Likert scale with the responses of terrible (1), poor (2), fair (3), good (4), and excellent (5). Higher scores indicate higher levels of sleep quality while lower scores indicate lower levels of sleep quality. Snyder et al., (2018) demonstrated that this single-item sleep quality scale (SQS) had inverse strong correlations with other sleep quality scales, such as the Morning Questionnaire Insomnia (MQI)

(r=-.76) and the Pittsburgh Sleep Quality Index (PSQI) of r=-.91. These results indicate high criterion validity (Snyder et al., 2018).

Life Satisfaction

The single-item life satisfaction scale (Cheung & Lucas, 2014) measures subjective perceptions of life satisfaction. This is a single item scale which asks: "during the past 7 days, how satisfied have you been with your life?". This is rated on a 5-point Likert scale with the indicators: very dissatisfied (1), dissatisfied (2), somewhat satisfied (3), satisfied (4), very satisfied (5). Higher scores denote a higher level of life satisfaction, and lower scores denote a lower level of life satisfaction. Cheung and Lucas (2014) demonstrated that this single item measure is highly correlated with the popular multi-item scale: Satisfaction with Life Scale (SWLS) (r=.78-.80). This indicates high criterion validity between the SWLS and the one-item scale (Cheung & Lucas, 2014).

Procedure

The mindfulness provider advertised the 14-day mindfulness challenge to several New Zealand organizations. Participants that wanted to participate signed up to the 14-day trial. Participants were emailed with information about accessing the portal. Upon sign-up, participants completed the pre-intervention survey which included all of the indicators: wellbeing, energy levels, general health, sleep quality, and life satisfaction. The 14-day challenge then opened with a new mindfulness session being uploaded daily during the work week, i.e. Monday to Friday. This equates to 14 mindfulness tracks and one introduction to mindfulness session that could be listened to. After the 14-day challenge, participants completed the follow-up survey which included the same items asked at the pre-intervention time point. The mindfulness provider contacted the participants that completed the pre-intervention survey yet did not engage with any mindfulness sessions. These participants were asked whether they wanted to complete the post-survey to become part of a control group.

Results of Study 1A

The data was analyzed on IMB Statistical Package for the Social Sciences (SPSS), Statistics 26. The first step of the analysis was to calculate a composite value for the wellbeing scale for each participant. This composite score is the average score across the wellbeing items for each participant. From this point on, when discussing wellbeing this refers to the composite wellbeing score, unless otherwise mentioned. Secondly, participants that were included in the analysis completed the surveys at both time points, this meant that data from participants that had not completed both surveys were discarded from the data set. Descriptive statistics were calculated for each indicator and reliability analyses were conducted for the wellbeing scale.

Results from the reliability analysis for the wellbeing scale in Study 1A indicated a satisfactory level of internal reliability at α=.83 (Cronbach, 1951).This analysis was repeated at the post-intervention time point and had a Cronbach's alpha of α=.71 which is also a satisfactory level of reliability. It is important to note that Study 1A did have a small sample size which would have impacted the scale's reliability for this study. Conversely, the reliability analysis in Study 1B for the same wellbeing scale demonstrated a Cronbach's alpha of α=.69 at baseline. This does not meet the minimum Cronbach's alpha required to demonstrate an acceptable level of internal reliability (Cronbach, 1951). Further exploratory factor analysis identified that this wellbeing scale loaded on one factor. The decision has been made to continue with this wellbeing scale despite being just below the required internal reliability as this scale is a widely used and validated scale. It is clear that this wellbeing scale has distinctive wellbeing indicators, thus the results section will provide an analysis of the individual items of the wellbeing scale alongside the overall wellbeing score. The reliability analysis was also conducted for T2 in Study 1B, to which an acceptable level of internal consistency was demonstrated by α= .85 which scores within the acceptable range (Cronbach, 1951).

Drop Out vs. Engaged Participants at Baseline

There was a large number of participants who completed the T1 survey (47) yet chose not to engage in the mindfulness program. It poses an interesting question about whether there were differences between the people that participated in the mindfulness program compared to the people who dropped out. Hence, an independent t-test analysis has been conducted to evaluate whether there were differences at baseline. The only variables that demonstrated differences between engaged vs. drop out participants at baseline were for levels of wellbeing $t(66)=-2.45$, $p=.02$, and for levels of general health $t(66)=-2.69$, $p=.01$. The people who dropped out of the mindfulness program and only completed T1, had a lower group mean for both wellbeing and general health, compared to the participants who continued and engaged with the mindfulness program. All other variables (i.e., energy, sleep-quality, and life satisfaction) had no significant difference between the groups. It is also worth noting that there were no statistically significant differences between responses from the control and intervention group at baseline, across any of the health and wellbeing indicators.

Hypothesis Testing

Repeated measures ANOVA and paired samples t-tests were conducted to determine whether there were significant group differences between the control and intervention groups, as well as whether there were improvements across indicators between pre- and post-intervention. These results are displayed in Table 1.

Modified Brinley plots were also conducted for this analysis. The aim of the modified Brinley plots were to provide an in-depth analysis and interpretation of findings alongside the ANOVAs and paired samples t-test. The modified Brinley plot can be used to examine individual differences in a dependent variable across time-points (Blampied, 2017). Typically, the individual score for the first time-point (T1) is demonstrated on the X-axis, and the score for the second time-point (T2) is illustrated on the Y-axis which creates a coordinate on the

plot (Blampied, 2017). Modified Brinley plots have a 45° line which is used to determine whether there has been a within-person change in response over time. So, provided that both the X and Y axes have the same origin and scale, the data point will fall directly on the 45° line if there has been no change across the two time-points (Robinson, 2018). Hence, when there has been either an increase or decrease in levels of the dependent variable, this data point will deviate from the 45° line. As the survey responses are discrete data points i.e., participants can only score between 1 to 5 across all survey items, this means that some data points were superimposed over each other. To counteract this, the data was purposely 'jigged' (i.e., systematically rounded by .02 for each score) so that each data point could be represented on the graph. It is important to note that this was done only for the purpose of displaying the data points on the graph; other calculations (i.e., effect size, ANOVA, t-tests) were done with the true scores, not the jigged ones. Figure 1 is the modified Brinley plot for energy, sleep-quality, life satisfaction and health for Study 1A. Figure 2 displays the modified Brinley plot for overall wellbeing.

Table 1.
Descriptive Statistics and Repeated Measures ANOVA Analysis.

		T1	T2						95% CI for Mean Diff.	
		Mean(SD)	Mean(SD)	Mean Diff.		F	Sig.	η^2	Lower	Upper
Energy	Control	2.14(1.07)	2.57(.98)	.43	Group	6.08*	.02	.19	.14	1.53
	Intervention	2.86(.91)	3.52(.81)	.66	Time	7.32*	.01	.22	.13	.96
					Group*Time	.35	.56	.01		
Sleep Quality	Control	2.86(1.07)	3.14(.90)	.28	Group	.02	.88	.00	-.59	.68
	Intervention	2.76(.89)	3.33(.91)	.57	Time	2.74	.11	.10	-.10	.96
					Group*Time	.31	.59	.01		
Life	Control	3.00(.82)	3.57(.54)	.57	Group	.31	.59	.01	-.45	.79
Satisfaction	Intervention	3.24(.77)	3.67(1.02)	.43	Time	5.08*	.03	.16	.04	.96
					Group*Time	.10	.75	.00		
Health	Control	2.71(.76)	3.00(1.00)	.29	Group	2.91	.10	.10	-.13	1.42
	Intervention	3.43(1.08)	3.57(.81)	.14	Time	1.79	.19	.06	-.12	.54
					Group*Time	.20	.66	.01		
Wellbeing	Control	3.00(.66)	2.89(.50)	-.11	Group	6.98*	.01	.21	.14	1.09
	Intervention	3.48(.78)	3.77(.51)	.29	Time	.08	.78	.00	-.25	.33
					Group*Time	.90	.35	.03		

Note. T1 denotes baseline responses, T2 denotes post-program responses, SD refers to the standard deviation. Diff. refers to difference.
*Significant at p= <.05. ** Significant at p= <.01.

Figure 1.

Modified Brinley Plots for Energy Levels, Sleep Quality, Life Satisfaction, and Health.

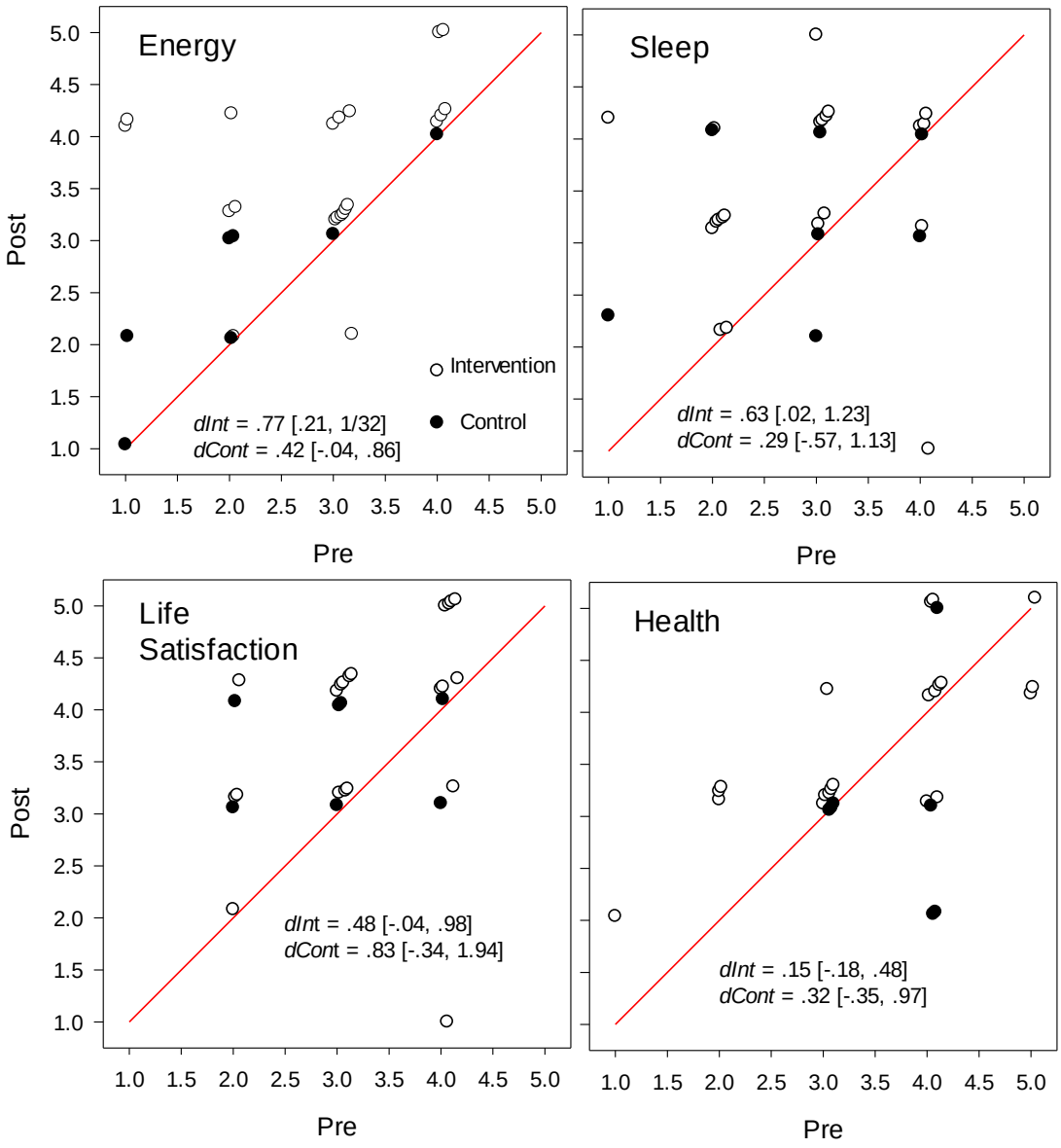
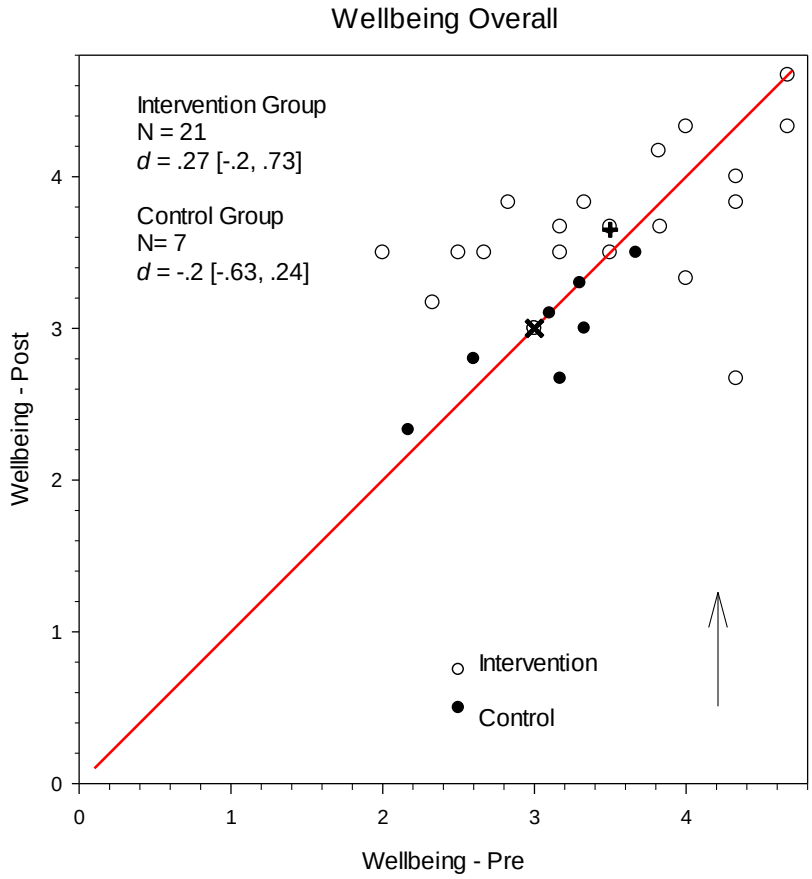


Figure 2.

Modified Brinley Plots for Composite Wellbeing Score.



Note. X = average score for the control group; + = average score for the intervention group.

Energy

The intervention group demonstrated a significant average increase in energy levels from 2.86 at T1 to 3.52 at T2. The repeated measures ANOVA demonstrated a statistically significant main effect for both the groups $F(1,26)=6.08$, $p=.02$, $\eta^2=0.19$ and time $F(1,26)=7.32$, $p=.01$, $\eta^2=.22$. Results from a paired t-test demonstrated that the intervention group significantly increased in energy levels between T1 and T2, $t(20)=-3.00$, $p=.01$, this is consistent with the finding from the modified Brinley plot. The 95% CI [.21, 1.32] of the modified Brinley plot does not include 0, which also shows significance. Conversely, the control group did not show a significant difference in energy levels between T1 and T2, with the average slightly increasing from 2.14 to 2.57, $t(6)=-2.12$, $p=.08$. The 95% CI [-.04, .86] for

the control group includes 0, which demonstrates a non-significant difference for the control group. These results provide support for the hypothesis that, participants in the intervention group that engaged in the mindfulness program demonstrate a significant improvement in self-reported energy levels following the completion of the intervention, compared to the control group.

Sleep Quality

The repeated measures ANOVA analysis demonstrated a non-significant difference in sleep quality across time $F(1,26)=2.74$, $p=.11$, $\eta^2=.10$. The intervention group (2.76 to 3.33) and control group (2.86 to 3.14) both had average increases in sleep-quality over time. Similarly, the ANOVA demonstrated a non-significant difference between the control and intervention groups $F(1,26)=.02$, $p=.88$, $\eta^2=.00$. However, on closer analysis through a paired t-test, the intervention group showed a significant increase in sleep-quality between T1 and T2, $t(20)=-2.17$, $p=.04$. Conversely, the control group did not demonstrate a significant difference in responses between the two time points, $t(6)=-.68$, $p=.52$. Hence, there were differences between the ANOVA results and paired samples t-test results. There may be multiple explanations for why the t-test is more sensitive than the ANOVA result, however the most plausible reason is likely that there may be a power issue resulting from the small sample size. Additionally, the possibility of an incongruent result such as this one, is one of the reasons why modified Brinley plots were conducted, so that further information and exploration can be undertaken. The finding from the paired samples t-test is consistent with the modified Brinley plot analysis. The 95% CI [-.57, 1.13] from the modified Brinley plot for the control group includes 0, which indicates that there was no significant difference between levels of sleep-quality for the control group. Alternatively, the modified Brinley plot for the intervention group only just achieved statistical significance through the 95% CI [.02, 1.23], as it is only marginally above 0. Visually, the graph demonstrates that most participants in the intervention

group either improved in sleep-quality between T1 and T2, or levels of sleep-quality remained stable.

In summary, while there is evidence from the paired samples t-test and modified Brinley plot that the intervention group may have just achieved statistical significance for an increased level of sleep-quality over time, there is also a need to look at this increase in relation to the control group. The ANOVA result demonstrated that there was a non-significant difference between the intervention and control group. Hence, due to this result and potential power issues, there is not enough evidence to safely support the hypothesis that participants that have undergone the mindfulness intervention would statistically increase in levels of sleep-quality compared to the control group.

Life Satisfaction

Repeated measures ANOVA identified that there was a statistically significant difference in levels of life satisfaction between T1 and T2 with a medium effect size $F(1,26)=5.08$, $p=.03$, $\eta^2=.16$. Both the intervention (3.24 to 3.67) and control group (3.00 to 3.57) showed an average increase in life satisfaction over time. However, repeated measures ANOVA also identified that there was a non-significant difference between control and intervention groups $F(1,26)=.31$, $p=.59$, $\eta^2=.01$ Further analysis from the paired samples t-tests confirmed this non-significant difference in levels of life satisfaction for the intervention group $t(20)= -1.91$, $p=.07$, and the control group $t(6)=-1.55$, $p=.17$. This is consistent with the conclusions reached by the modified Brinley plot with the 95% CI for the intervention [-.04, .98] and control group [-.34, 1.94] both including 0 (see Figure 1). The hypothesis that the intervention group would demonstrate a significant increase in levels of life satisfaction between T1 and T2 compared to the control group was not supported.

Health

Levels of average self-reported health did not significantly differ between T1 and T2 for both the control (2.71 to 3.00) and intervention groups (3.43 to 3.57). The repeated measures ANOVA demonstrated a non-significant difference between the groups $F(1,26)=2.91$, $p=.10$, $\eta^2=.10$ and time $F(1,26)=1.79$, $p=.19$, $\eta^2=.06$. Further results from a paired t-test demonstrated that there was a non-significant difference in levels of health between T1 and T2 for both the intervention group $t(20)= -.90$, $p=.38$, and the control group $t(6)= -1.00$, $p=.36$. Similarly, the modified Brinley plots displayed the same finding, with the 95% CI including 0 for both the intervention [-.18, .48] and control group [-.35, 0.97]. Thus, the hypothesis that there would be a significant increase in levels of general health between T1 and T2 for the intervention group relative to the control group is not supported.

Wellbeing

There was a statistically significant difference in wellbeing between the intervention and control groups with a medium effect size $F(1,26)=6.98$, $p=.01$, $\eta^2=.21$. While the wellbeing group mean for the control group decreased from 3.00 to 2.89 between T1 and T2, the wellbeing group mean of the intervention group increased from 3.48 to 3.77 between T1 and T2. There was no significant difference in wellbeing levels between the time points $F(1,26)=.08$, $p=.78$, $\eta^2=.00$. Likewise, there was no significant interaction effect between the groups and time $F(1,26)=.90$, $p=.35$, $\eta^2=.03$. The paired samples t-test further supported that there was no significant difference in levels of wellbeing for the intervention group $t(20)=-1.16$, $p=.26$, or for the control group $t(6)=.52$, $p=.63$. The modified Brinley plot demonstrates that the average score for the intervention group is above the 45° line, this means that there was an average increase in wellbeing over time for the intervention group. However, it was not enough to produce a significant result, as indicated by the 95% CI [-.20, .73] which includes 0.

The control group demonstrated not much deviation between the time points, evident by the group average being close to the 45° line. There was a slight average decrease in wellbeing from the control group although not significant as the 95% CI [-.63 to .24] includes 0. The results fail to support the hypothesis that people that have undergone the intervention will demonstrate a significant increase in levels of wellbeing between T1 and T2, compared to the control group.

As the wellbeing score was the average of an individual's responses for the wellbeing items, a further analysis of the individual wellbeing items is required. Table 2 demonstrates the descriptive statistics for each scale item as well as the results from the repeated measures ANOVA. These wellbeing scale items are: During the past 7 days…I've been feeling useful; I've been feeling relaxed; I've been dealing with problems well; I've been thinking clearly; I've been feeling close to other people; I've been able to make up my own mind about things.

Table 2.
Wellbeing Items: Descriptive Statistics and Repeated Measures ANOVA Analysis.

		T1	T2						95% CI for Mean Diff.	
		Mean(SD)	Mean(SD)	Mean Diff.		F	Sig.	η^2	Lower	Upper
Feeling Useful	Control	3.57(1.13)	3.43(.79)	-.14	Group	2.83	.11	.10	-.12	1.16
	Intervention	4.05(.92)	4.00(.71)	-.05	Time	.21	.65	.01	-.52	.33
					Group*Time	.05	.82	.00		
Feeling Relaxed	Control	2.00(.58)	3.00(.58)	1.00	Group	2.00	.17	.07	-.22	1.17
	Intervention	2.90(1.26)	3.05(1.02)	.15	Time	3.53	.07	.12	-.05	1.20
					Group*Time	1.98	.17	.07		
Dealing with Problems	Control	3.00(1.16)	2.43(.54)	-.57	Group	8.00**	.01	.24	.23	1.44
Well	Intervention	3.33(1.02)	3.76(1.15)	.43	Time	.10	.76	.00	-.54	.40
					Group*Time	4.73*	.04	.15		
Thinking Clearly	Control	3.14(.69)	2.71(.76)	-.43	Group	3.56	.07	.12	-.06	1.39
	Intervention	3.48(1.08)	3.71(.85)	.23	Time	.25	.62	.01	-.48	.29
					Group*Time	3.11	.09	.11		
Feeling Close to Others	Control	2.86(.90)	2.71(.49)	-.15	Group	5.39*	.03	.17	.08	1.35
	Intervention	3.38(.97)	3.62(.92)	.24	Time	.04	.85	.00	-.46	.55
					Group*Time	.61	.44	.02		
Ability to Make up Mind	Control	3.43(.54)	3.14(.69)	-.29	Group	1.72	.20	.06	-.26	1.16
	Intervention	3.71(1.15)	3.76(.89)	.05	Time	.27	.61	.01	-.59	.35
					Group*Time	.53	.47	.02		

Note. T1 denotes baseline responses, T2 denotes post-program responses, SD refers to the standard deviation, diff. refers to difference.
*Significant at p= <.05. ** Significant at p= <.01.

Wellbeing Items

All responses from the control group demonstrated a non-significant decrease between the two time points, except for the item 'I've been feeling relaxed', to which the control group demonstrated a significant average increase from 2.00 to 3.00 between time points t(6)=-2.65, p=.04. Interestingly, for this relaxation item, the intervention group also had an average increase from 2.90 to 3.05 however it was not enough to produce a significant result t(20)=-.44, p=.67.

The results from the repeated measures ANOVA demonstrated that there was a significant group difference for the "I've been dealing with problems well" item between the control and intervention group F(1,26)=8.00, p=.01, η^2=.24. The intervention group had an average increase between timepoints from 3.33 to 3.76, whilst the control group displayed an average decrease from 3.00 at T1 to 2.43 at T2.There was also a significant interaction effect between the group and time for this item F(1,26) = 4.73, p=.04.

Another item of interest is 'I've been thinking clearly', to which the control group had a decrease in group mean from 3.14 to 2.71 whereas the intervention group had an average increase over time from 3.48 to 3.71. While both of these mean differences were not enough to produce a significant group or time difference, it is a noteworthy trend. Similarly, the item "I've been feeling close to others" had a significant group difference between the intervention and control group F(1,26) = 5.39, p=.03, whereby the control group had an average decrease over time (from 2.86 to 2.71) while the intervention group had an average increase (from 3.71 to 3.76).

Method

Study 1B Context and Overview

Study 1B is a pre-post intervention design with a sample of New Zealand teachers. All participants were given access to the mindfulness program, and there was no control group. Contextually, there was community transmission of COVID-19 in New Zealand during Study 1B, this means that participants based in Auckland were in Level 3 lockdown for half of the challenge, and Level 2.5 lockdown for the second half of the challenge. Participants outside of Auckland were at Level 2 during the entire challenge. This research did not collect information regarding the location of participants, this means that this research is not able to consider "location" as a control variable in this study.

Design

Study 1B was a pre-post mindfulness program. Data was collected at two timepoints, at sign up for the mindfulness challenge (T1) and following the completion of the mindfulness challenge (T2). There was no control group.

Participants

Participants in Study 1B were teachers in New Zealand. 339 participants registered for the challenge, with 182 participating in the mindfulness program. 305 participants completed the T1 survey, and 39 participants completed the T2 survey. The final sample had 37 participants that achieved the inclusion criteria of completing both T1 and T2 surveys and engaging with the mindfulness program.

Materials

The same materials and measures were used as outlined in the method of Study 1A. There were no changes to the indicators or to the mindfulness content between Study 1A and Study 1B.

Procedure

The same procedure as outlined in the method of Study 1A was used for Study 1B. However, there was no control group so participants that completed T1 but did not engage in the mindfulness program were not contacted by the mindfulness provider to form a control group.

Results of Study 1B

Firstly, the composite wellbeing score was calculated for every participant as the average of all responses to the wellbeing items. Secondly, only participants that responded at both T1 and T2, were included in the statistical analysis.

Drop Out vs. Engaged Participants

There was a dropout rate of 88% for Study 1B. This figure was calculated by the number of people who registered for the challenge and completed the T1 survey (305), compared to how many engaged in the mindfulness program and completed both the surveys (37). This begs the question, were there differences in baseline levels between the people that engaged with the program vs. the people that dropped out of the program? To investigate this, an independent t-test analysis was conducted on baseline responses between the two groups. The independent t-test concluded that there were no statistically significant differences in responses between the people that would go on to engage with the program compared to the participants that dropped out.

Quantitative Statistical Analysis

Repeated measures ANOVA, paired t-tests, and descriptive statistics were conducted to analyze whether there were differences in responses between T1 and T2, this can be viewed in Table 3. Similarly, modified Brinley plots are also provided. Figure 3 displays the

modified Brinley plot for energy, sleep-quality, life satisfaction, and health. Figure 4 displays the modified Brinley plot for overall wellbeing between pre- and post-intervention.

Table 3.
Descriptive Statistics and Repeated Measures ANOVA Analysis.

	T1	T2					95% CI for Mean Diff.	
	Mean(SD)	Mean(SD)	Mean Diff.	F	Sig.	η^2	Lower	Upper
Energy	2.16(.50)	3.19(.88)	1.03*	5.08*	.03	.13	.76	1.29
Sleep Quality	2.43(.84)	3.24(.80)	.81*	9.16**	.01	.21	.51	1.11
Life Satisfaction	2.76(.72)	3.73(.77)	.97*	15.38**	.00	.31	.65	1.29
Health	2.81(.85)	3.65(.82)	.84*	10.35**	.00	.23	.54	1.13
Wellbeing	2.95(.55)	3.66(.61)	.71*	11.73**	.00	.25	.48	.95

Note. *Significant at p= <.05. ** Significant at p= < .01. Wellbeing = average wellbeing score across items. SD refers to the standard deviation. Diff. refers to difference.

Figure 3.

Modified Brinley Plots for Energy Levels, Sleep Quality, Life Satisfaction, and Health, for Study 1B.

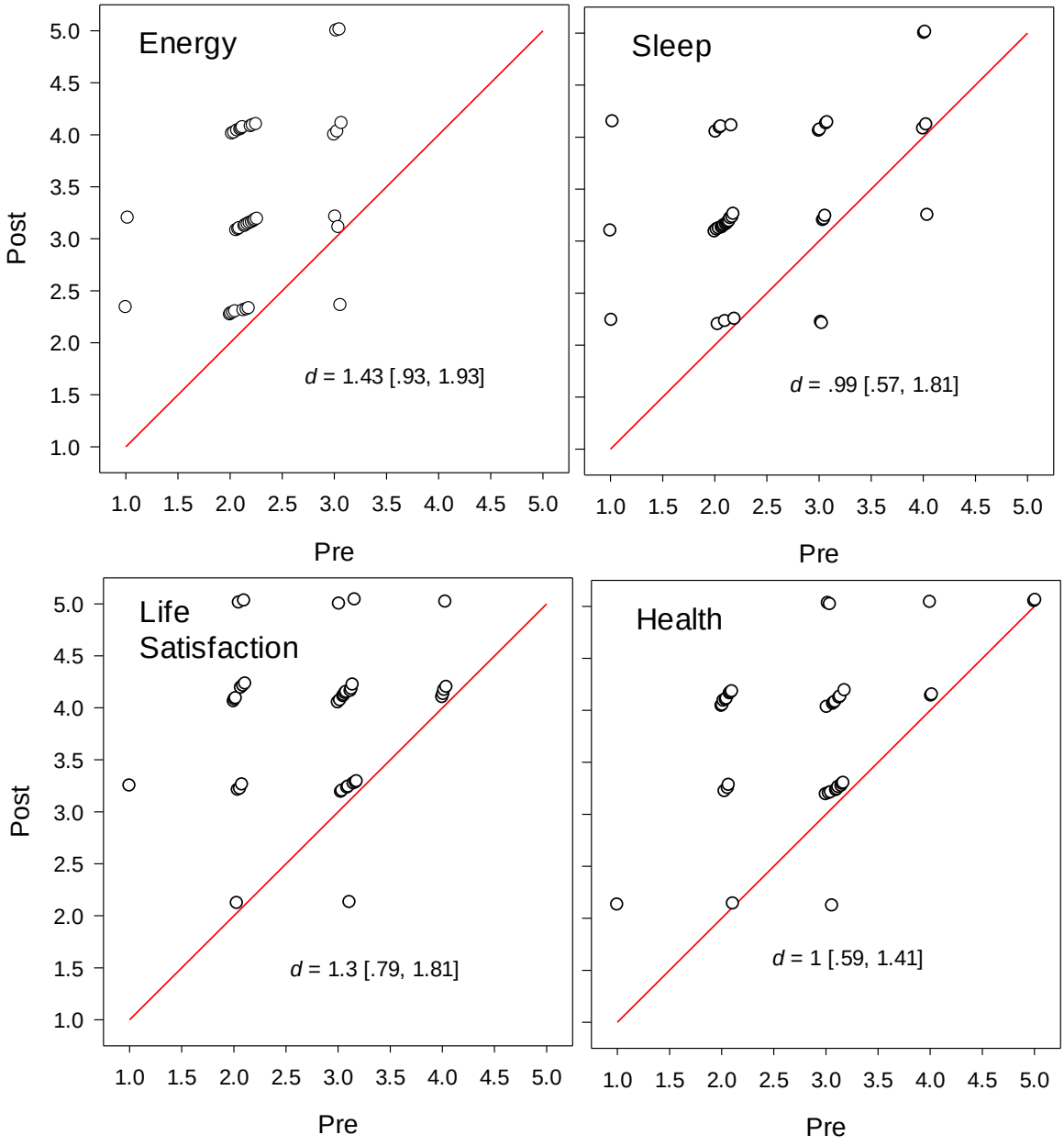
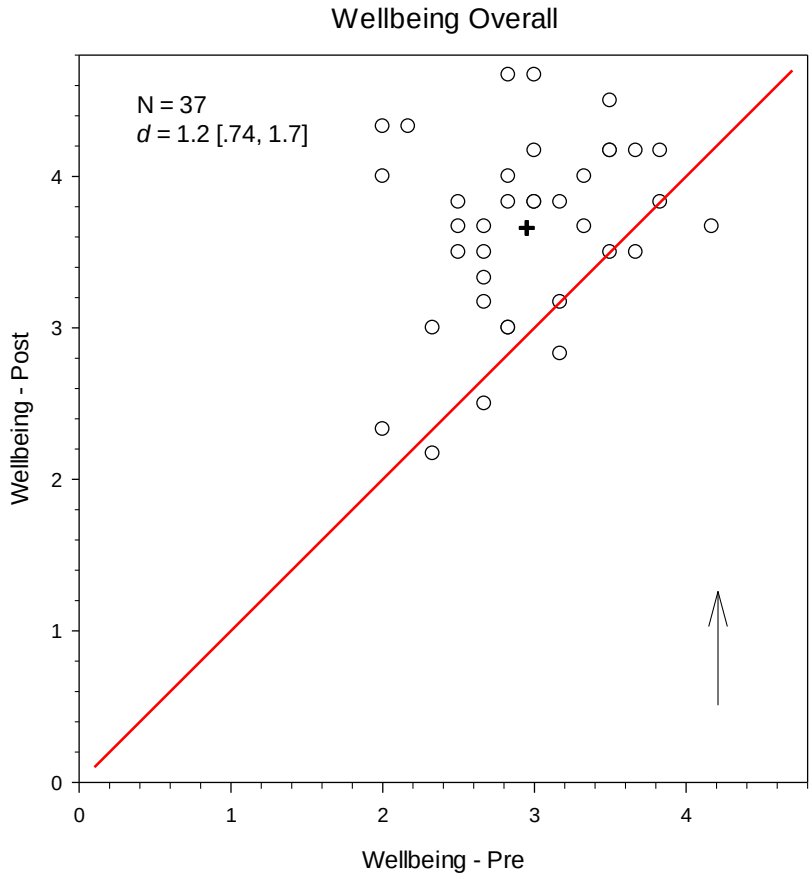


Figure 4.

Modified Brinley Plots for Composite Wellbeing for Study 1B



Note. + = average score.

Energy

The ANOVA results demonstrated a statistically significant increase in levels of reported energy between T1 and T2 responses F (1, 35) =5.08, p=.03. There was a significant increase in group mean for energy levels from 2.16 at T1, to 3.19 at T2. Similarly, most data points from the modified Brinley plot are above the 45° line and show a large effect size, d=1.43, 95% CI [.93, 1.93], which suggests a significant increase in levels of energy between T1 and T2. Hence, the hypothesis that participants that have undergone the mindfulness intervention would demonstrate a significant increase in energy levels is supported.

Sleep Quality

The repeated measures ANOVA F (1, 35) =9.16, p=.01 demonstrated a significant improvement between sleep quality responses from T1 and T2, with the group mean significantly increasing from 2.43 to 3.24. From the modified Brinley plot, most data points are above the 45° line, there was also a large effect size, d=.99; 95% CI [.57, 1.40], which is evidence that there was a significant improvement in sleep quality between T1 and T2. This evidence supports the hypothesis that participants who have undergone the mindfulness intervention would have an increased level of sleep quality between T1 and T2.

Life Satisfaction

Following a repeated measures ANOVA, there was a statistically significant increase in levels of life satisfaction over time F(1,35)=15.38, p=.00, with a large η^2 effect size (η^2=.31). The group mean significantly increased from 2.76 at T1 to 3.73 at T2. Similarly, most data points on the modified Brinley plot are above the 45° line, with a large effect size (d=1.30), and a 95% CI [.79, 1.81] that does not include 0. This result supports the hypothesis that participants who have undergone the mindfulness intervention would demonstrate an increased level of life satisfaction.

Health

Results from the repeated measures ANOVA demonstrate there was a statistically significant improvement over time in reported health levels F(1,35)=10.35, p=.00. The group mean at T1 was 2.81, and the group mean at T2 was 3.65, so there was a significant mean difference of .84. Visually, it is clear to see that most people have improved in levels of health by the proportion of data points sitting above the 45° line. There is also a large effect size (d=1.00) with a 95% CI [.59, 1.41] that does not include 0. Hence, these results support the hypothesis that there would be an increased level of health for participants that have participated in the mindfulness intervention.

Wellbeing

Repeated measures ANOVA demonstrated a statistically significant increase in wellbeing over time $F(1,35)=11.73$, $p=.00$. The group mean at T1 was 2.95, and the group mean at T2 was 3.66, so there was a significant mean difference of .71. The modified Brinley plot shows that most of the data points are above the 45° line, which demonstrates there has been a significant increase in levels of wellbeing over time, with a large effect size ($d=1.20$). Furthermore, the 95% CI [.74, 1.70] does not include 0. This finding supports the hypothesis that there would be a significant increase in wellbeing from T1 to T2 for participants that have engaged in this mindfulness intervention. This data represented the composite score for the wellbeing items. Table 5 presents a breakdown analysis of all the specific wellbeing items on this scale.

Table 4.
Wellbeing Items: Descriptive Statistics and Repeated Measures ANOVA Analysis.

	T1	T2					95% CI for Mean Diff.	
	Mean(SD)	Mean(SD)	Mean Diff.	F	Sig.	η^2	Lower	Upper
Feeling Useful	3.14(.95)	3.81(.70)	.68**	14.44**	.00	.29	.32	1.04
Relaxed	2.57(.93)	3.51(.96)	.95**	24.89**	.00	.41	.56	1.33
Dealing Problems	3.05(.82)	3.62(.86)	.57**	12.23**	.00	.25	.24	.90
Thinking Clearly	2.97(.76)	3.62(.83)	.65**	18.42**	.00	.34	.34	1.00
Feeling Close	2.73(.93)	3.59(.64)	.87**	29.03**	.00	.45	.54	1.19
Make Up Mind	3.24(.86)	3.81(.85)	.57**	9.96**	.00	.22	.20	.93

Note. *Significant at p= <.05. ** Significant at p= < .01. SD refers to the standard deviation. Diff. refers to difference.

Wellbeing Items

As identified in Table 4, all wellbeing items have demonstrated a statistically significant increase between the two time points. All items have large effect sizes from the results of the partial eta squared from the repeated measures ANOVA (University of Cambridge, n.d.). Responses to "I've been feeling relaxed" and "I've been feeling close to others" have the largest effect sizes (η^2=.41 and η^2=.45, respectively).

General Discussion

The aim of both Study 1A and Study 1B was to evaluate the 14-day mindfulness challenge on a range of wellbeing indicators. While a similar procedure and indicators were used for both Study 1A and Study 1B, there was a difference in terms of methodological approach. Study 1A was a quasi-experimental pre-post design whereby there was self-selection into either the control or intervention group. Whereas Study 1B was a pre-post design with all participants engaging in the mindfulness challenge. This is an important distinction to make as this discussion unfolds.

Study 1B participants demonstrated statistically significant improvement from pre-intervention to post-intervention across all health and wellbeing indicators. There was a statistically significant increase in levels of energy, sleep quality, life satisfaction, general health, and wellbeing. These findings are consistent with the extensive body of mindfulness research (e.g., Bartlett et al., 2019; Good et al., 2016; Lomas et al., 2017). Furthermore, all wellbeing items within the Short Warwick-Edinburgh Mental Well-being Scale (Stewart-Brown et al., 2009), also demonstrated a statistically significant increase. Hence, all of the hypotheses were supported in Study 1B, by significant improvements across all health and wellbeing indicators for participants that have undergone the mindfulness intervention.

Study 1A demonstrates a vastly different picture than Study 1B. As predicted, self-reported energy levels significantly improved between the timepoints for the intervention group, while the control group demonstrated no significant difference for any of the health and wellbeing indicators. However, contrary to hypothesized, levels of life satisfaction and health demonstrated a non-significant improvement between timepoints for the intervention group compared to the control group. The findings from the modified Brinley plots, paired samples t-test, and repeated measures ANOVA, fail to support the hypothesis that participants that engage in a mindfulness program demonstrate a significant increase in life satisfaction and health.

Additionally, responses to sleep-quality were an interesting finding, whereby the t-test and the modified Brinley plot suggest that the intervention group just achieved statistical significance, yet the repeated measures ANOVA demonstrated that differences over time and between groups were not significant. These contrasting results point towards a power issue as a result of the small sample size in Study 1A, and consequently this research is unable to comfortably support the associated hypothesis that by engaging in this mindfulness intervention, levels of sleep-quality will statistically increase in relation to the control group.

There was also a non-significant difference in levels of wellbeing for the intervention group in Study 1A between timepoints and compared to the control group. This finding is incongruent with the general consensus of the mindfulness literature (e.g., Bartlett et al., 2019; Good et al., 2016; Lomas et al., 2017). On closer analysis of the individual wellbeing items, wellbeing means for the control group decreased for all but one item, while the means for the intervention group either increased or remained stable between the timepoints. Hence, this finding suggests that this mindfulness intervention may have been a protective tool against wellbeing decline when participants were exposed to an external stressor. Considering the well-

established mental health implications of COVID-19 (Banks & Xu, 2020), this is a very promising and optimistic result for the mindfulness literature as well as for disaster researchers.

When considering the evidence above, both studies have different features that need to be taken into consideration. For example, while Study 1A had a control and intervention group, Study 1B did not have a control group, yet Study 1B had almost double the sample size of the intervention group from Study 1A. While one is naturally drawn to understanding why and where the differences in these results lie, it is just as important to first acknowledge the consistent findings between both studies. The consistent result across both studies was that participation in this mindfulness program was associated with increased levels of self-reported energy. This is likely because mindfulness promotes an accepting and non-judgmental thought process which leads to a more informed appraisal of the situation and emotions (Brown & Ryan, 2003). As noted, the relationship between engaging in a mindfulness intervention and energy levels is still in its infancy, with more research required to uncover the mechanisms behind this relationship.

Participants from Study 1B reported a significant improvement in levels of wellbeing, health, and life satisfaction, while findings from Study 1A demonstrated no significant differences for these variables between timepoints and compared to the control group. Although more research is required to explain and establish these contrasting results, there were some noteworthy differences between the participant groups that may partially account for these findings. Firstly, data was analyzed from participants who completed a) both surveys from pre- and post-intervention, and b) engaged in the mindfulness program. One could argue that participants who met this criterion were also the participants who were happier and more satisfied with the program. Individuals who may have registered with the program yet did not find it beneficial are unlikely to have persevered and completed the post-intervention survey, and hence were not identified and analyzed with this data. Training reactions and feedback data

were not collected, so the only comparisons able to be made were with baseline levels of wellbeing indicators between drop-out and engaged groups.

The context of these studies also needs to be discussed as both Study 1A and Study 1B were conducted in the first half of 2020 with various alert level changes as a result of COVID-19. Hence, differences in participation timing relative to the onset of COVID-19 and New Zealand lockdowns is likely a contextual confounding variable impacting these results. Furthermore, the other confounding variables to consider include a) how informed the participants were of the effects of mindfulness, b) whether the participants had pre-conceived ideas of mindfulness, and c) whether the participants had engaged in mindfulness programs prior to this 14-day challenge. Mindfulness is now being encouraged into the New Zealand school curriculum with the 'Pause, Breathe, Smile' program (Mindfulness Education Group, n.d.). This means that New Zealand teaching staff are being encouraged to complete this one-day program so that they can facilitate mindfulness sessions within their classroom (Mindfulness Education Group, n.d.). Hence, given that the participants in Study 1B were New Zealand teachers, these participants may have been better informed about the benefits of mindfulness, and likely engaged in mindfulness programs before. Thus, prior knowledge and exposure to mindfulness is a confounding variable that may partially explain the differences between the samples.

This research has been able to present many contributions to the mindfulness literature. This research has contributed two samples with two designs on the same mindfulness program, which has enabled a discussion of contextual and methodological factors that may have significantly steered the direction of the intervention study results. Furthermore, this research has provided strong methodology and provided evidence regarding the role of mindfulness interventions for wellbeing promotion when faced with external stressors. The use of a control group in Study 1A was invaluable for comparison purposes because while wellbeing did not

reach statistical significance in Study 1A, there was a noticeable decreasing trend across 5 out of 6 wellbeing indicators for the control group, while the average for the intervention group increased for 5 out of 6 items. Hence, mindfulness may be a protective factor when exposed to an acute stressor. This research has also been able to provide evidence that engaging in a mindfulness program can be associated with an increase in energy levels, this was a consistent finding across both studies. This is a valuable contribution to the literature given how the relationship between these variables is still in its infancy and given how important feeling energized is to workplace attitudes and performance (Lam, Wan, & Roussin, 2016), this makes it a noteworthy contribution to the literature.

Limitations and Future Research Directions

Whilst this research has strengths, there are also limitations which need to be considered upon review of these results. Firstly, these studies were conducted in the first half of 2020, and therefore heavily impacted by COVID-19. As noted, during both Study 1A and Study 1B there were alert level changes which was a result of community transmission of COVID-19 in New Zealand. This likely would have meant lifestyle changes for participants as well as adapting to different work conditions. Similarly, there is a need to account for the emotions that participants may have felt such as uncertainty or anxiety about COVID-19, which are normal in times of abrupt change. These are all factors worthy of consideration when reviewing these results. However, this research has a significant strength whereby Study 1A and Study 1B were both conducted within fairly similar time frames and will be one of the few unique mindfulness evaluations conducted during a global pandemic. This research may help disaster researchers by providing an insight into mindfulness and wellbeing related indicators during uncertain times.

Furthermore, Study 1A did have a small sample size which was especially noticed with the control group (n=7). This research counteracted the small sample size issue by applying a

statistical analysis from the modified Brinley plots which is an analysis well-suited for small sample sizes. Additionally, there was an imbalance between the size of the intervention (n=21) group compared to the control group (n=7) which may have impacted the power of the statistical analysis. This is an important note as Moser (2020, p.104) outlines that having balanced sample sizes between groups is a strong recommendation for experimental design. Hence, future research should strive for larger samples and balanced intervention and control groups.

It is well established that wellbeing interventions typically have a low participation rate (Robroek, van Lengthe, van Empelen, & Burdorf, 2009). A low participation rate was noticeable in both Study 1A and Study 1B, (i.e., how many people signed up to the 14-day challenge vs. how many people engaged with the mindfulness program and completed both surveys). The results from Study 1B concluded that there were no significant differences between people that dropped out of the program compared to the people that engaged in the mindfulness program from the health and wellbeing indicators examined. However, in Study 1A, the people that dropped out of the mindfulness program had lower levels of health and wellbeing compared to the participants that continued with the mindfulness intervention. There are many factors that may have influenced their behaviour to not end up participating, one of which is likely to have been motivation to participate. Furthermore, there could still be differences between those that dropped out vs. those that remained engaged, that were not able to be explored within the confines of this research such as: stress levels at baseline, employee workload, and perceptions about mindfulness. This is an opportunity for future research to explore, as a model can be created to predict who is most likely to drop out of the mindfulness program. As Study 1A demonstrated, it was the participants that chose not to engage in the mindfulness program that had lower levels of health and wellbeing on average. Furthermore, the control group from Study 1A tended to have lower averages at baseline than the intervention

group. While this trend was not enough to produce a significant result, it is an interesting trend as the control group were the participants that signed up to participate yet chose not to listen to any mindfulness tracks. This highlights once again the need for further exploration of differences between people that have the capacity to engage compared to those that choose to drop out. Hence, with this information about who is most likely to drop out, the mindfulness provider can send follow up messages or other prompts to try to keep employees engaged with the intervention.

A limitation of this research was that there was minimal employee input into this mindfulness intervention. It is well established employee participation is essential for deciding whether to implement a wellbeing intervention, as well as for deciding the scope and expectations for the intervention (Street & Lacey, 2018). This is because employees are usually in a better position than wellbeing consultants and executive leaders, to set expectations about the process and intended outcomes of the wellbeing initiative. This study provided the same standard mindfulness program to all participants from both Study 1A and Study 1B. This was a valuable component to this research because it enabled direct comparisons between the two studies. However, use of a standard mindfulness program meant that there was minimal employee input into the planning phase of these interventions, and there was no invitation for employee input towards the content within the mindfulness interventions.

By overlooking the participants' occupational context as well as the external, acute stressors employees were facing (i.e., a global pandemic), may have led to perceptions of the mindfulness program being irrelevant and unnecessary. This perception in turn may have led to a decreased engagement or decreased motivation to participate. This relevancy issue is a significant component of creating engaging and successful workplace wellbeing interventions, as employees must perceive the wellbeing intervention as having relevant content for it to be successful (Day & Penney, 2017, p.316). For example, given how turbulent 2020 has shaped

out to be, providing context-relevant modules within the mindfulness program (e.g. dealing with uncertainty, how to navigate change etc.) could have increased the effectiveness of this intervention. Similarly, how employees perceive and appraise the wellbeing intervention is a significant predictor of employee participation with the intervention (Nielsen, Randall, & Albertsen, 2007). This is interesting given the large dropout rates that were present with this research.

Furthermore, Nielsen et al., (2007) concluded that if employees are not properly informed about the wellbeing intervention, not given the opportunity to influence the wellbeing intervention, and if wellbeing interventions have a poor implementation (e.g., accessibility issues, or a lack of employee support for the intervention etc.), then even the most theoretically grounded interventions will not be able to succeed. Moreover, despite the significant and compelling research body supporting mindfulness, many people still associate mindfulness with spirituality because of its Buddhist origins (Barrett, 2017). Participation in design and perceptions of relevance may have hindered the effectiveness of this intervention. Future research should explore the relationship between employee perceptions of relevancy, employee input, and employee engagement as mediators for wellbeing intervention effectiveness. This is an important avenue to investigate as employee perceptions have been linked to motivation levels to participate in health-promoting initiatives (Rongen et al., 2014).

Given how important perceptions are to motivation, future research could examine the differences between how a mindfulness program is communicated to employees. As communication is critical to the perception and appraisal of any changes in organizations such as a wellbeing intervention (Nielsen et al., 2007). Skurak, Malinen, Kuntz, and Näswall (2019), explored organization communication formats towards corporate volunteering motivation. Hence, transferring these findings to this context, organizations should communicate a clear rationale for engaging with the program and should acknowledge and address employee's

feelings and attitudes towards the program, to promote autonomous motivation. While Skurak et al., (2019) conducted this research surrounding engagement with corporate volunteering, future research could apply the same principles and explore communication formats with wellbeing promotion interventions (e.g., a neutral invitation, a science-informed invitation, or an invitation with a personal endorsement from someone in the organization) to see if there is a difference in engagement and motivation to participate.

This study was limited by only having a non-randomized control and intervention group for one study. There are consistent calls for more randomized control trials (RCTs) which is the gold standard of intervention evaluations (Kendall, 2003). However, achieving this full randomization can be difficult and sometimes unethical in applied settings. Often organizations are uneasy about forcing people into categories so will often opt instead for employees to be able to self-select into a control or intervention group. Similarly, there are often issues for participants such as scheduling conflicts or the ethics behind randomly assigning someone to a control group who really wanted to have access to a wellbeing program. Hence, these reasons can make it difficult to have a fully randomized study to achieve that gold standard. Despite these difficulties, there have been some outstanding workplace RCT studies evaluating workplace mindfulness interventions such as Aikens et al., (2014), and Wolever et al., (2012). Alongside these studies, while this research was unable to achieve full randomization it was able to have a control group through self-selection as well as surpassing common methodological shortfalls of other mindfulness studies, such as having a consistent mindfulness program, consistent indicators, and consistent time points, across both studies.

Mindfulness has been studied extensively in the psychology and management literature (Bartlett et al., 2019). However, there is an interesting dichotomy about mindfulness wellbeing programs in workplaces because on the one hand they are becoming increasingly visible and prevalent in organizations. Yet, there are still significant gaps in how mindfulness relates to

role-related outcomes which are specific to organizations (Bartlett et al., 2019) . For example, there is minimal information about the relationship between mindfulness and innovative work behaviors, and mindfulness and organizational citizenship behaviours, etc. (Lomas et al., 2017). This creates an opportunity for future research to explore and solidify findings related to mindfulness and other role-related outcomes, to increase the relevance and effectiveness of these interventions in work settings.

Finally, a limitation of this study was that this research did not measure mindfulness as a construct. Thus, while these results demonstrated a pre- and post-perspective of a mindfulness program, this research is unable to conclude that these findings are a result of an increase in trait and state mindfulness. Future research should apply the MAAS scale or other validated mindfulness scales to capture this information. The health and wellbeing scales utilized in this research were selected purposely to address the limited or conflicting findings within the literature, yet they were all positively framed scales. This is a criticism consistent with the wider mindfulness literature whereby the majority of empirical research examines mindfulness on 'positive' scales, which means that high scores indicate a positive outcome e.g., life satisfaction (Lomas et al., 2017). Furthermore, Lomas and colleagues (2017) note that the research has tended to interpret these high scores to also mean an absence of a construct, for example, high scores of wellbeing may also mean a low score of depression. However, this assumption creates obvious construct validity issues. Due to the reliance on positive scales, it means that negative constructs such as feeling uncomfortable or distressed have been overlooked. There is emerging research that critically evaluates mindfulness on more negative scales and the results are unsettling. There have been more than 20 published case reports where mindfulness meditation has induced significant distress (van Dam et al., 2017). While most of these case reports did not have full access to the medical history of their participants, it still raises the issue of how individuals with pre-existing mental and physical health conditions

might be impacted from mindfulness meditation. Similarly, Schlosser et al., (2019) reported that an alarming 25% of participants in a sample of 1,323 had an unpleasant experience with mindfulness.

Qiu and Rooney (2019) outlined in their model that mindfulness can unveil traumatic events and in some cases the person may have to relive the trauma that they have repressed because they are in a meditative state. Mindfulness encourages people to quieten the background chatter in their mind which means that emotions or memories that may have been repressed are given an opportunity to be unveiled again (Qiu & Rooney, 2019). Hence, as mindfulness is becoming more common in workplaces and more employees are engaging in mindfulness than ever before, the urgency for this information about possible adverse effects to be continuously investigated in future research cannot be overstated. Qiu and Rooney (2019) urge for mindfulness providers to share this information with the participants and HR departments so that both parties can evaluate whether they want to participate with a full understanding of the potential risks. Examples of at-risk employees for adverse mindfulness effects, include those that have experienced sexual and emotional abuse, a significant loss, a traumatic event, severe personality disorders, or severe depression (Miller, 1993). Hence, it is of the utmost importance that future research evaluates not only the prevalence of unpleasant experiences for employees engaging in mindfulness programs, but also to examine HR departments and mindfulness providers to determine the level of awareness that they have about these adverse effects.

Theoretical and Practical Implications

This study has several theoretical contributions to the literature. The key implications that this section will focus on are legal consequences of mindfulness programs, strong and consistent methodology, and contributing evidence about engaging with a mindfulness intervention and the associated energy levels and wellbeing outcomes. Firstly, a point that was

previously raised was the limited research around the unpleasant side of mindfulness where it can induce emotional distress for at-risk employees. This is an implication worthy of consideration for both practitioners and academics as there is a devastating gap in the literature. Employees and organizations that invest time and money into wellbeing interventions trust that the appropriate research has been conducted. The very fact that engaging in a workplace mindfulness intervention is marketed to employees as a wellbeing critical promotion exercise, yet emerging research is simultaneously suggesting the very opposite for at-risk employees is an area that requires immediate attention.

Furthermore, there may be legal consequences for both the organization and the mindfulness provider if an employee felt coerced into participating in a wellbeing intervention and then experienced significant distress as a result (Strassle & Berkman, 2019). For example, if a mindfulness intervention is communicated as a department challenge where everyone is expected to participate, the at-risk employee may feel like they do not have a choice with whether to participate. Additionally, performance management systems often place emphasis on teamwork and collaboration (Venkateswara, 2016, p.3) so an employee may perceive opting out of a team challenge as being detrimental to their job performance so will likely feel pressure to participate. While these are hypothetical situations, they may be a reality for some employees unless proper awareness and procedure is created around this. Hence, Qiu and Rooney (2019) suggest a pre-mindfulness screening which can be distributed by the mindfulness provider and can be used to confidentially identify at-risk employees, so that the employee can be made aware of the risks and can be supported to make an informed decision about whether they would like to participate.

Secondly, there have recently been critical reviews which have raised issues with the methodology of mindfulness in the workplace studies. Often citing issues with poor controls, inconsistent outcome measures across time points, poor reporting of methods, and low sample

sizes (King, 2019). There are also differences within the mindfulness programs which adds another layer of complexity. Mindfulness programs often get altered by commercial providers who change the setting, content, and length of sessions, to fit the demands of the organization (Eby et al., 2019). As these mindfulness programs are slightly different it is problematic from a methodological standpoint to draw direct comparisons between studies. This research has been able to contribute a dual study with strong methodology to the mindfulness literature. Whilst observing the common issues, this research has been able to evaluate a mindfulness program with a control group for comparison purposes. Furthermore, this research has deliberately used the same measures, the same pre-post design, the same mindfulness program, and the same duration of the mindfulness challenge between two studies. Hence, due to so many methodological similarities between Study 1A and Study 1B, direct comparisons can be drawn which most other mindfulness studies are not able to do.

This research contributed some valuable information from Study 1B whereby following a 14-day mindfulness challenge, there was a statistically significant increase in levels of energy, sleep quality, life satisfaction, health, and wellbeing. This evidence is a thrilling finding for the mindfulness intervention and wider mindfulness literature, that even with the uncertainty that COVID-19 brought to 2020 and the well documented mental health impact that COVID-19 continues to have on people (Banks & Xu, 2020), that participants from Study 1B demonstrated that engagement in this mindfulness intervention was associated with improvements across all health and wellbeing indicators. This has the practical implication that mindfulness interventions may retain its effectiveness even in times of uncertainty and change.

Despite these optimistic results, Study 1A demonstrated that energy levels were the only indicator to significantly improve in both studies. This is an interesting implication and contribution to the literature, because at time of writing the relationship between a mindfulness program and energy levels has not been thoroughly explored. Finally, the results from the

wellbeing variable in Study 1A enabled this research to observe average decreases in the wellbeing of the control group, while the intervention group tended to have an average increase across wellbeing items. While, these mean differences were not enough to secure a statistically significant result, it is an interesting trend and may provide evidence for mindfulness as a protective factor when exposed to an acute stressor, hence, this is an important contribution to the mindfulness literature. As both Study 1A and Study 1B were conducted during such an uncertain time, all of these findings are valuable contributions to the wider literature as this research is a direct insight into the health and wellbeing of so many New Zealanders during abrupt change and provides insight regarding the role that mindfulness interventions can have during such unprecedented times.

Conclusion

The current study presents valuable information towards the growing workplace mindfulness literature. On the one hand, there is evidence from Study 1B that after completing a 14-day mindfulness challenge, participants demonstrated an increase in levels of wellbeing, health, life satisfaction, energy, and sleep quality. This result holds interesting potential given the widespread impacts of COVID-19 on wellbeing and the fact that despite these uncertain times, mindfulness retains its effectiveness. Conversely, evidence from Study 1A demonstrated a bleaker picture, with a significant improvement for only energy levels for the intervention group, when compared to a control group. This study was able to draw many implications and reasons for why these results from Study 1A were largely inconsistent with the mindfulness literature (e.g., Bartlett et al., 2019; Good et al., 2016; Lomas et al., 2017). The findings were impacted by COVID-19 and by the changes in New Zealand alert levels during the 14-day challenge for both Study 1A and Study 1B. Furthermore, this research discussed the differences between the samples and the idea that the teacher sample from Study 1B likely had a greater understanding and prior exposure to mindfulness compared to the sample from Study 1A. There was also a smaller sample size in Study 1A compared to Study 1B that may have impacted the results. The limitations of this study were addressed alongside suggestions for future research such as: investigating differences in how a wellbeing intervention is communicated to employees, and how this may influence employee perception and employee engagement with the intervention. Additionally, there is an opportunity for mindfulness interventions in workplaces to explore other role-related outcomes that are specific to organizations such as innovative work behaviours. Finally, this study presents a warning to both mindfulness providers and organizations to the unpleasant experiences and adverse effects that mindfulness can trigger. These findings have recently been emerging in the literature and require more awareness for both employees and organizations.

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Appendix A: Information and Consent Form
Online Mindfulness - Information Page

Department: Psychology, Speech, and Hearing Department
Telephone: +64 3 3694397

Email: katie.procter@pg.canterbury.ac.nz

Date: 4.5.20
HEC Ref: 2020/20

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Kia ora,

My name is Katie Procter, a dissertation student completing a Masters of Science in Applied Psychology. The aim of my project is to **evaluate a workplace mindfulness intervention by assessing whether this intervention improves health and wellbeing over time.**

If you choose to take part in this project, you will be asked to complete **two short online surveys.** The first survey measures participants at baseline. The mindfulness intervention will then run for 3 weeks, and then participants will be invited to participate in a post-intervention survey. Each survey should take no longer than 5 minutes to complete.

Participation is voluntary and you have the right to withdraw at any stage without penalty. Just state your intent to withdraw in the comment box at the end of the survey.

Although we will match your responses across the two surveys, **you can be assured of the complete confidentiality of data gathered**: your identity as a participant, and your individual responses to the surveys, will not be shared with your organisation or anyone outside the UC research team (i.e., myself and my supervisor Assoc. Prof. Joana Kuntz). Joana can be contacted at joana.kuntz@canterbury.ac.nz and will be pleased to discuss any concerns you may have about participation in the project.

Data will be stored on a password protected computer, and any identifying information that you provide will be protected. No third party will have access to raw data, including your organisation. The results of the project may be published in peer-reviewed journals (without identifying information). The dissertation is a public document and available through the UC Library. If you would like to receive a general summary of the results, please indicate you would on the consent form and the results will be sent to you.

There is a small risk of distress originating from the questionnaire. Some of the questions may concern sensitive issues, such as your perceptions of work demands and stress. If you do feel uncomfortable you are advised to withdraw from the survey. If you require further assistance, potential sources of help can be found at the foot of this sheet. Alternatively, you are advised to contact your local GP.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study your consent will be signified by moving to the next page and starting the survey.

Thank you kindly for your time and participation,

New Zealand Counselling Services

Lifeline Aotearoa - 0800 543 354

Need to Talk? - Free call or text 1737

Consent Form

☐ I have been given a full explanation of this project and have had the opportunity to ask questions.

☐ I understand what is required of me if I agree to take part in the research.

☐ I understand that participation is voluntary and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.

☐ I understand that any information or opinions I provide will be kept confidential to the research team and that any published or reported results will not identify the participants or their organization. I understand that a thesis is a public document and will be available through the UC Library.

☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after 5 years.

☐ I understand the risks associated with taking part and how they will be managed.

☐ I understand that I can contact the researcher Katie Procter, katie.procter@pg.canterbury.ac.nz or supervisor Joana Kuntz, joana.kuntz@canterbury.ac.nz for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)

☐ I would like a summary of the results of the project.

☐ By signing below, I agree to participate in this research project.

Name:_____

Signed:_____

Date:_____

Email Address: (*For report of findings, if applicable*):_____

Appendix B: Title of Mindfulness Sessions

Day	Title of Mindfulness Session
Day 0	Introduction
Day 1	Why?
Day 2	Zap Your Inbox
Day 3	Mindful Cuppa
Day 4	Just Start
Day 5	Friday Tidy
Day 6	Just Breathe
Day 7	Let's Stroll
Day 8	Mountain Meditation
Day 9	Strong Emotions
Day 10	Clock Off
Day 11	Desk Body Scan
Day 12	Thought Pop
Day 13	Mindful Communication
Day 14	Patience

Appendix C: List of Scale Items for Study 1A and Study 1B

Indicator	Items
Wellbeing	During the past 7 days…
	I've been feeling useful
	I've been feeling relaxed
	I've been dealing with problems well
	I've been thinking clearly
	I've been feeling close to other people
	I've been able to make up my own mind about things
Energy	During the past 7 days, how would you rate your energy levels?
General Health	How would you rate your health at the present time?
Sleep	During the past 7 days, how would you rate your sleep quality overall?
Life Satisfaction	During the past 7 days, how satisfied have you been with your life?"